

I. Scope of Work – Water Treatment Services

Subject: Specifications for water treatment for one Cooling Tower, two Raypac Water Boilers, and one closed loop system located at Morgan County Correctional Complex, 500 Flat Fork Road Building O, Wartburg, Tennessee. A more detailed list of equipment is provided on the last page of this Scope of Work.

- A. A water meter is installed on the makeup water line to determine the amount of leakage between monthly checks. The Water Treatment Company shall determine the capacity (in gallons) being treated along with the leak rate of each system. This information shall be provided to the Facility Manager in a report format within the first 60 days of the contract.
- B. A five gallon 150 psi shot feeder on three support legs should be installed on each separate hot and/or chilled water loop. If not presently installed, the Water Treatment Company shall provide the facility manager a cost to install these shot feeder(s). The shot feeder(s) will become property of the state. If requested by the Facility Manager, the servicing Water Treatment Company can provide a price for a by-pass filter system: A separate unit or a filter assembly that fits inside the shot feeder consisting of a filter bag or filter cartridge (50 micron).
- C. If a leak occurs and it is between 0 to 1,000 gallons per month the five gallon shot feeder is adequate to maintain corrosive protection in the loop.
- D. If the leakage is more than 1,000 gallons, but less than 1% loop volume, then the Facility Manager may request from his servicing Water Treatment Company to provide a quote to install one of the following two suggested feed systems:
 - 1. Water meter with single pulse timer to control a chemical pump, which will automatically feed the corrosion inhibitor in proportion to the new water demand. This control system can be used on hot or chilled water systems.
 - 2. A reverse conductivity controller, with flow switch in probe, that will sense conductivity reduction from the loss of water and chemical, and will activate the chemical pump to feed chemical until the conductivity set point is reached. Can be used on chilled water but ensure the manufacturer provides a probe that will work on hot water.

Example: Chilled loop has been charged to 1000 ppm of nitrate based corrosion inhibitor. The conductivity of the loop water is tested and reads 2200 Millimhos per Centimeter (mmhos/cm). The controller is set to 2100 mmhos/cm. If leaks occur the conductivity will drop, and once 2100 mmhos/cm is reached the controller will activate the chemical pump, which will keep pumping until 2200 mmhos/cm is reached.

3. If the leakage is more than 1% of loop volume per month, the leakage problem needs immediate repair.

- A. For chilled water, consideration should then be made to feed a potable water treatment chemical at a rate not to exceed 10ppm or po4. This will give some corrosion protection until the leakage problem is solved. Treatment rate is approximately one pound of product per 1,000 gallons of makeup water.

Note: The Facility Manager, after consulting with his servicing Water Treatment Company, will decide if the treatment will continue or be terminated until repairs have been made.

Example: If more than one gallon of chemical product per day is required, the system usually is considered untreatable. Repair should be an emergency situation.

- B. For hot water loops, if po4 will not work satisfactorily. The leak problem needs to be solved so that the nitrate based product can again be used effectively.

Note: For any closed water loop system in excess of 1% per month, and the Facility Manager desires that it be treated, the Water Treatment Company shall bill separately for chemicals to bring system up to normal levels.

- C. Once the repairs have been made, the Water Treatment Company will be responsible for recharging the system with corrosion inhibitor utilizing proper purchasing procedures.

Chemicals normally used in chilled and hot water closed loops:

Azole: min 30 ppm, with sodium nitrate: 800 to 1200 ppm

Tolyltriazole with sodium nitrate: 800 to 1200 ppm

For chilled water microbiological control:

- A. The servicing Water Treatment Company will submit a water sample to a laboratory semi-annually to determine if the system is free of nitrate reducers and provide written test results to the Facility Manager.
- B. If nitrate reducers are present the Facility Manager will consult with his servicing Water Treatment Company and may request a price to dose the system with a product such as glutaraldehyde, 100 ppm, which is approximately: 0.83 lbs. of product per 1,000 gallons of system volume.
- C. Cooling tower: The water treatment program will provide corrosion scale/deposit and microbiological control.
- D. The Facility Manager will indicate what control equipment is owned by the state or his present servicing Water Treatment Company. If the servicing Water Treatment Company determines that additional control equipment is needed for his proposed

program, the state will purchase that equipment separately utilizing proper purchasing procedures and that equipment shall become property of the state.

1. A conductivity controller will be provided to control bleed, chemical feed, and cycles of concentration which will vary per location depending on the makeup water quality. Conductivity of the cooling tower water should not exceed +1.8 on the Langelier index. This usually will be from 4.5 to 5.5 cycles of concentration.

Example chart for guidance:

Maximum allowable cycles of concentration

		Make-up Water "M" alkalinity in ppm as CaCO ₃			
		0-50	51-150	151-250	251-350
Make-up Water Calcium Hardness in ppm as CaCO ₃	0-50	10	5	3	2.5 cycles
	51-150	7	3	2.5	2* cycles
	151-250	5	3	2*	1.5* cycles
	251-350	4	2.5*	2*	1.5* cycles
	351-450	4	2*	1.5*	** cycles
	451-550	4	2*	1.5*	** cycles

* A modified acid treatment program is suggested for these waters. The supplemental feeding of acid will reduce water usage.

** The non-acid cooling water treatment is not recommended for these waters.

Comment: An acid program will not be used unless the Water Treatment Company obtains prior approval of the Facility Manager.

Note: For systems where the meters are not functioning properly, the Water Treatment Company shall provide a cost to repair or replace these meters. These meters will become the property of the state.

Note: The servicing Water Treatment Company will submit a water sample to a laboratory to determine if the system is under control each quarter. The water treatment program shall maintain 2000 colony count or less in the cooling tower.

Building Water Testing:

- A. The servicing Water Treatment Company will take a water sample from all buildings on property and submit the sample to a laboratory to determine the condition of the water. This sample can be taken from any unfiltered water source i.e. sink, commode, faucet, etc. at each building.
- B. A sample will be taken from each building annually and can be taken from 10 buildings each quarter. This can be accomplished by taking 3 to 5 samples each month if desired.
- C. A report will be provided to the Facility Manager showing the analysis results from these tests. This report must also provide recommendations of any necessary treatment.

- D. At the completion of any recommended corrective actions, additional water analysis shall be performed to verify the effectiveness of such actions.
- E. The report will be in a format that allows the results of each building water sample be shown consecutively each year for the length of the contract.

II. General Requirements:

The omission of detailed specifications does not limit the quality of services to be provided and only the best commercial practices are acceptable. Boiler equipment shall be managed and maintained in accordance with rules and regulations set forth by the State of Tennessee, Department of Commerce and Insurance, Division of Boiler Inspection and Codes (T.C.A., chapter 27, section 53-2701-53-2715).

- A. Water Treatment Company must verify all testing equipment is adequate and functioning properly.
- B. Water Treatment Company must verify chemical feed control equipment is clean and calibrated.
- C. Water Treatment Company must inspect cooling tower and loop system for cleanliness and proper operation.
- D. Water Treatment Company will establish minimum levels/limits and reorder chemical inventory to be stocked at the facility. Water Treatment Company shall keep a 45 day supply of all necessary chemicals at the facility. The Water Treatment Company shall carry adequate stock to ensure timely delivery and adequate inventory for the duration of the contract.
- E. Shipping cost for chemicals is to be included in the monthly bid price.
- F. All empty containers are to be picked up by the vendor on each visit.
- G. The contractor awarded this service agreement is to have an established and qualified full time service staff with the ability to receive and dispatch service technicians upon request of the Facility Manager or an authorized designee.
- H. The contractor will provide telephone numbers of personnel to contact on an as needed basis. An outside answering service and/or voicemail system (i.e. answering machine/recorder) is not acceptable to the state as a contact.
- I. The contractor must have the equipment with an inventory of materials and supplies necessary to operate, test, and maintain boiler/chiller systems as referenced by this maintenance agreement.
- J. The contractor shall furnish a written report detailing results of chemical tests and inspection findings to the Facility Manager at the conclusion of each scheduled visit in the form of a service report. It must also include recommended control ranges and results of analysis by the service representative at the time of his/her visit.
- K. All visits by the service technicians shall be logged on-site as to date and time (i.e. time in and time out). Each service technician must sign-in and sign-out at the Maintenance Shop to verify their presence and length of stay.

L. A service voucher/job ticket shall be left at job site documenting services rendered. This service voucher/job ticket shall be required as supporting documentation of services provided and to assist in expediting payment upon receipt of an invoice.

M. Included in the monthly inspection charge/price are all materials, supplies, water treatment, chemicals, chemical analysis, and labor. Bidders should base their monthly inspection price on same.

N. The contractor must provide technical spec sheets and safety data sheets for all chemicals used for the treatment program.

O. The contractor must provide Proof of Insurance and Department of Revenue to the Facility Manager when contract is awarded. They must also provide a copy of Insurance Renewals for the duration of the contract.

P. A background check is required on every employee that visits the Institution. A form will be provided by the Facility Manager and it must be completed and returned before an employee can come on site.

Q. A 48 hour notice is required before a Technician can visit the Institution. All services will be performed between 6:30 AM and 2:30 PM, Monday through Friday except on state holidays. A list of holidays can be obtained each year during the month of January.

R. During the performance of contracted service, contractor will maintain a clean work area. Upon completion of any work, contractor will remove all trash and debris from the job site.

S. The contractor's service representative shall make scheduled service visits approximately every 30 days, making not less than 12 visits per year. During these visits, the service representative shall inspect all equipment and perform all analysis required at the site necessary to determine if the water treatment program is operating at optimum performance.

III. Special Requirements:

A. Facility Management may request the water treatment technician be present during the internal inspections of the Raypac Boilers. This may be done during the regular monthly service call. If this request is in addition to his regular monthly service call, a trip fee may be paid.

B. During the first month of the service contract, the water treatment technician will conduct a minimum of 4 hours of instruction on the operation of the water treatment program to Facility Staff. This instruction is to ensure the staff knows what to check during the performance of their daily equipment checks and any hazards that may exist with the treatment program. This may be done during the regular monthly service call. If this instruction is in addition to the monthly service call, a trip fee **will not** be paid.

C. Water Treatment Company will assist the Facility Staff each year with cleaning the cooling tower. All chemicals required will be provided at no additional cost to the facility. This may be done during the regular monthly service call. If this request is in addition to his regular monthly service call, a trip fee may be paid.

IV. Invoice Requirements:

- A. Invoices for monthly service should be submitted within 10 business days. Invoices will be sent by email to designated personnel. A list of names and email addresses will be provided to the winning bidder.
- B. Supporting documentation shall include, but not be limited to time and attendance records as well as invoice for parts and/or materials and shall accompany each invoice submitted for payment.

List of Equipment:

Cooling Tower – Model ESW15324H – Serial No. 6-297006

Top Raypac Boiler NB# 270588 – Mfr. Serial No. 0708270588 – Model # H9-2342B – TN # T70671

Bottom Raypac Boiler NB# 270584 – Mfr. Serial No. 0708270587 – Model # H9-2342B – TN # T70672

Any single maintenance work order that exceeds \$100,000, including contingencies and other related costs, must be approved by the SBC prior to proceeding in the contract.

Note: All Bidders are required to make a mandatory site visit to become familiar with our equipment and its location. **BIDS WILL NOT BE ACCEPTED FROM ANY COMPANY WITHOUT VISITING THE INSTITUTION.**